

Welcome to Paddle for the Edge!

Thank you for volunteering to conduct a survey of the Barnegat Bay's shorelines. As a community scientist, you become part of a project to collect critical data about current shoreline conditions.



Land and water interact at the edge, sometimes dramatically (think Superstorm Sandy!). The bay's shorelines are dynamic habitats, sometimes growing and sometimes eroding. Each shoreline is different, with the erosional (washing away) and accretional (trapping and accumulating) processes affected by physical forces (such as storm waves and boat wakes) and biological factors (such as mussel distribution and fiddler crab holes).

The data everyone collects will help us monitor the bay's shorelines and assist planners and resource managers in many ways — providing information about flooding and storm impacts, predicting how shorelines may react to sea-level rise, identifying restoration areas, assessing critical habitats, and appraising the recreational and commercial values of our estuaries.

This training manual provides step-by-step instructions on how to collect data and photos of conditions you might see along the edge. By following the procedures in the manual, you will help us ensure the quality of the data and its usefulness.

Please do not hesitate to ask any questions you may have along the way or provide suggestions about how to improve the program – we value your feedback. We hope you enjoy being a Paddle for the Edge community scientist. Thanks again, and let's get paddling!

Sincerely,

The Barnegat Bay Partnership



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I. Safety:

Follow these safe practices when paddling in an estuary

1. Follow **all** [U.S. Coast Guard](#), [N.J. State Police](#), and local **rules and regulations**.
2. **Always** paddle with a buddy! It's more fun and much safer!
3. Check the [weather](#) and know the [tide](#). **DO NOT** collect data if weather or current conditions make the water more challenging than your skill level.
4. Wear your **Personal Flotation Device** (PFD).
Note: U.S. Coast Guard regulations require all kayaks to have a life jacket on board.
5. Make sure you have **shore support**. Let someone know **where** you are going, **what** you will be doing, **how long** you expect to be gone, and **how many** people are in your group. Make sure to let them know when you come back safely, and what to do if they don't hear from you by the expected time.
6. Stay well-hydrated by bringing **water** or other beverages with you.
7. Have a first aid kit and all necessary **safety gear** with you and make sure it is easily accessible.
8. Wear clothing appropriate for the weather, temperature, and protection from insects.
9. **Never** mix alcohol or drugs with any kind of boating.
10. Stay within your **skill limits**. Make sure you always have enough energy to return to shore.

II. Using the ArcGIS Field Maps Application

1. Getting Started

- a. Go to the [Google Play Store](#) or [Apple's App Store](#).



- b. Search for “ArcGIS Field Maps” (by ESRI).



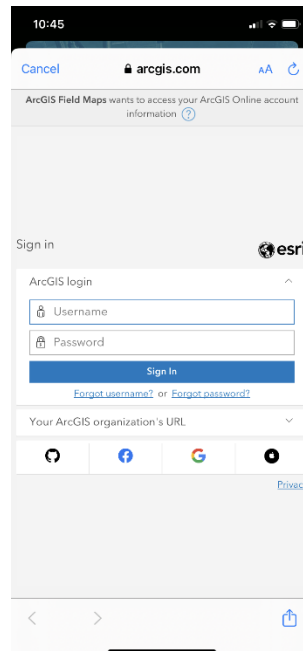
- c. Click “GET” then “Install” (iPhone) or “Install” (Android) to download it to your phone.

2. Signing In

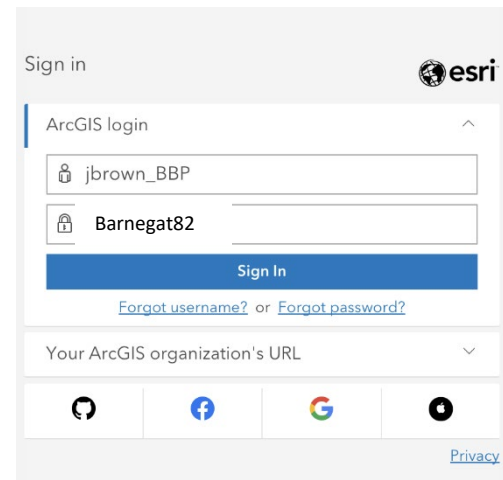
- a. Open the app. Select “Sign in with ArcGIS Online”
- b. Your username will be “**FirstInitialLastName_BBP**”. For example, the username for Joe Brown would be “jbrown_BBP”. Your password is: “**Barnegat82**”. Click “Sign in”.



View upon opening app

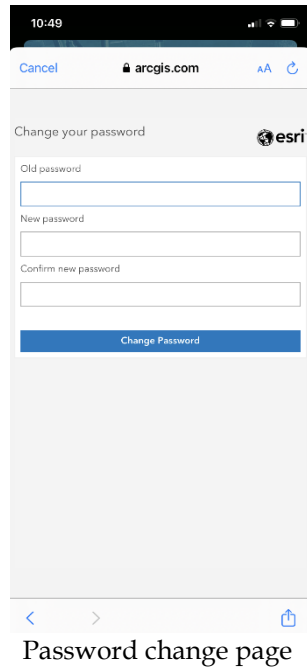


ArcGIS Online Sign in Page



Example log in for someone named Joe Brown. Usernames will be unique to each individual, but passwords for **ALL** will be Barnegat82.

- c. Change your password. Type **"Barnegat82"** into the first box and then your new password in the next two boxes.



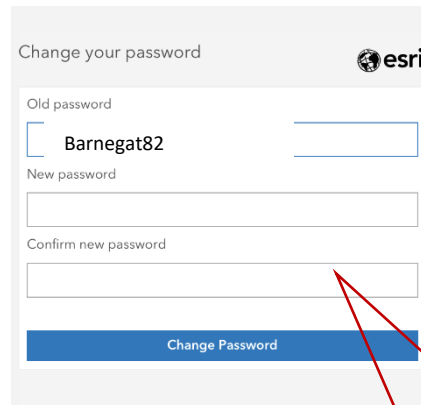
10:49
Cancel arcgis.com AA

Change your password esri

Old password
New password
Confirm new password

Change Password

Password change page



Change your password esri

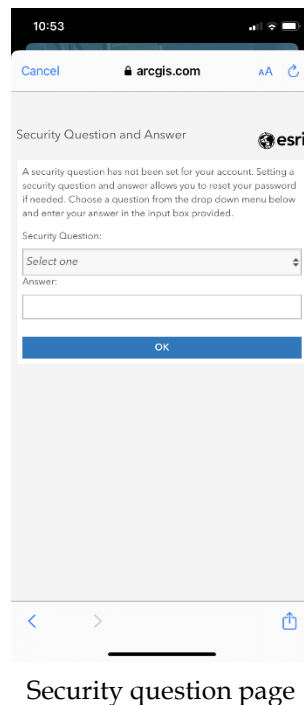
Old password
Barnegat82
New password
Confirm new password

Change Password

Enter Barnegat82 into the "Old Password" box and then your new password in the "New Password" boxes. **Your new password can be whatever you like!**

If you forget your password or it doesn't work, please don't try to change it yourself! Email us at Paddle4theEdge@gmail.com and we will take care of it for you!

- d. Select a security question, type your answer in the bottom box, and click "OK".



10:53
Cancel arcgis.com AA

Security Question and Answer esri

A security question has not been set for your account. Setting a security question and answer allows you to reset your password if needed. Choose a question from the drop down menu below and enter your answer in the input box provided.

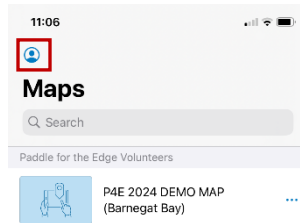
Security Question:
Select one
Answer:

OK

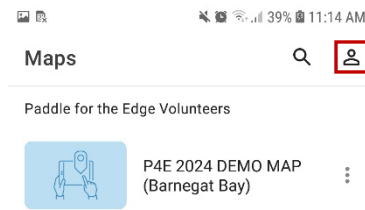
Security question page

3. Updating the Collection Settings

- a. The app should take you to a list of your maps the first time you log in. **Click** on your profile icon at the **top left** (iPhone) or **top right** (Android) of the screen.

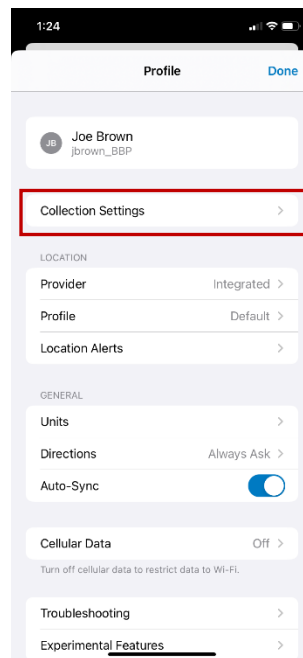


iPhone location of profile icon

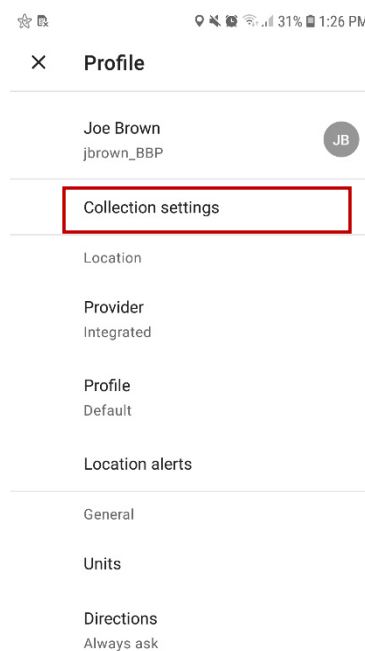


Android location of profile icon

- b. Select “Collection settings”



iPhone location of collection settings after clicking on the profile icon

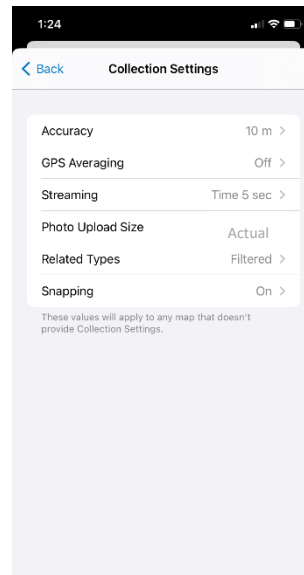


Android location of collection settings after clicking on the profile icon

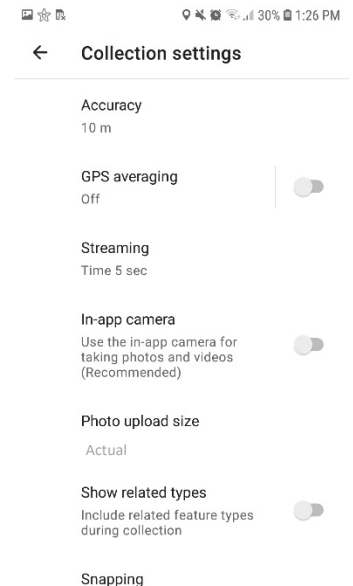
c. Select each parameter listed below and then enter/select the correct option.

- Accuracy: **10m**
- GPS Averaging: **Off**
- Streaming: **Time/5 sec**
- Photo Upload Size: **Actual**
- Related Types: **Filtered (off)**
- Snapping: **On**

d. Return to the list of maps.



iPhone view of changed collection settings

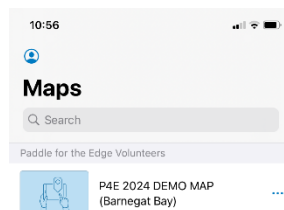


Android view of changed collection settings

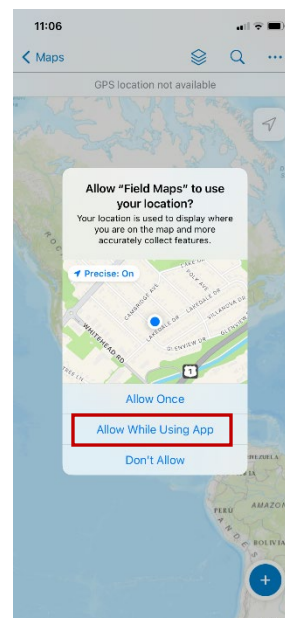
4. How to complete the survey form on the Field Maps app

- a. From your list of maps, select the map and select “**Allow Once**” if prompted for use of your location. When returning to the app at a later time, it may bring you straight to the map rather than the list.

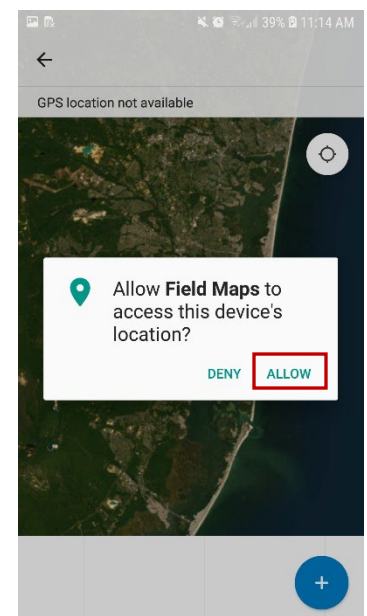
The map will show your **current** location, not your paddle assignment. If you are testing the app at home, it will display your house and neighborhood. If you are out paddling, it will show your location in the bay.



Maps page

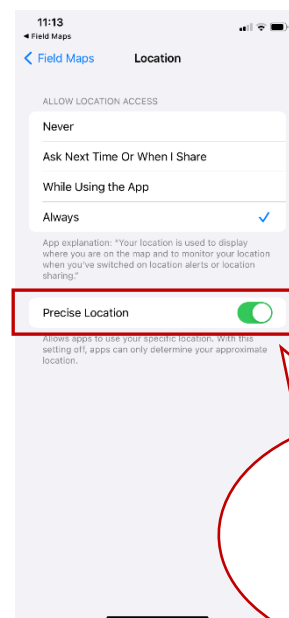
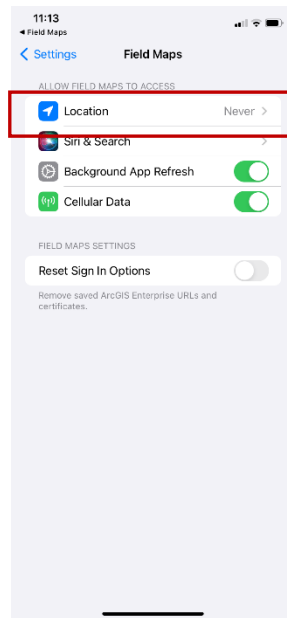
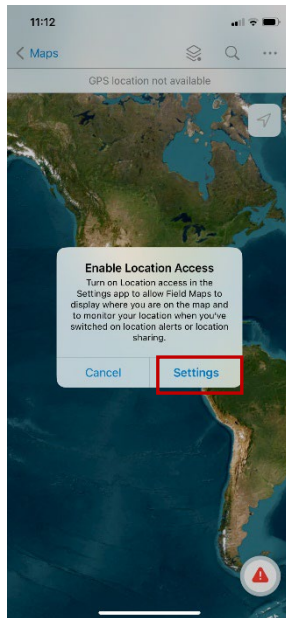


iPhone location usage prompt



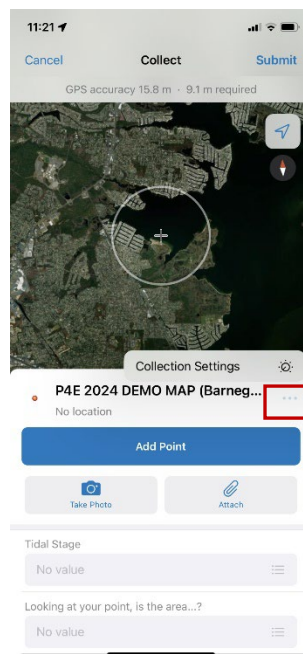
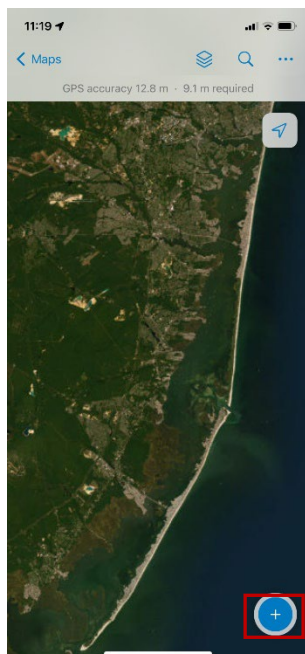
Android location usage prompt

Note: iPhone users may encounter a second prompt after hitting “Allow Once.” If “Enable Location Access” pops up, select “Settings,” then “Location” and change to “Always.”



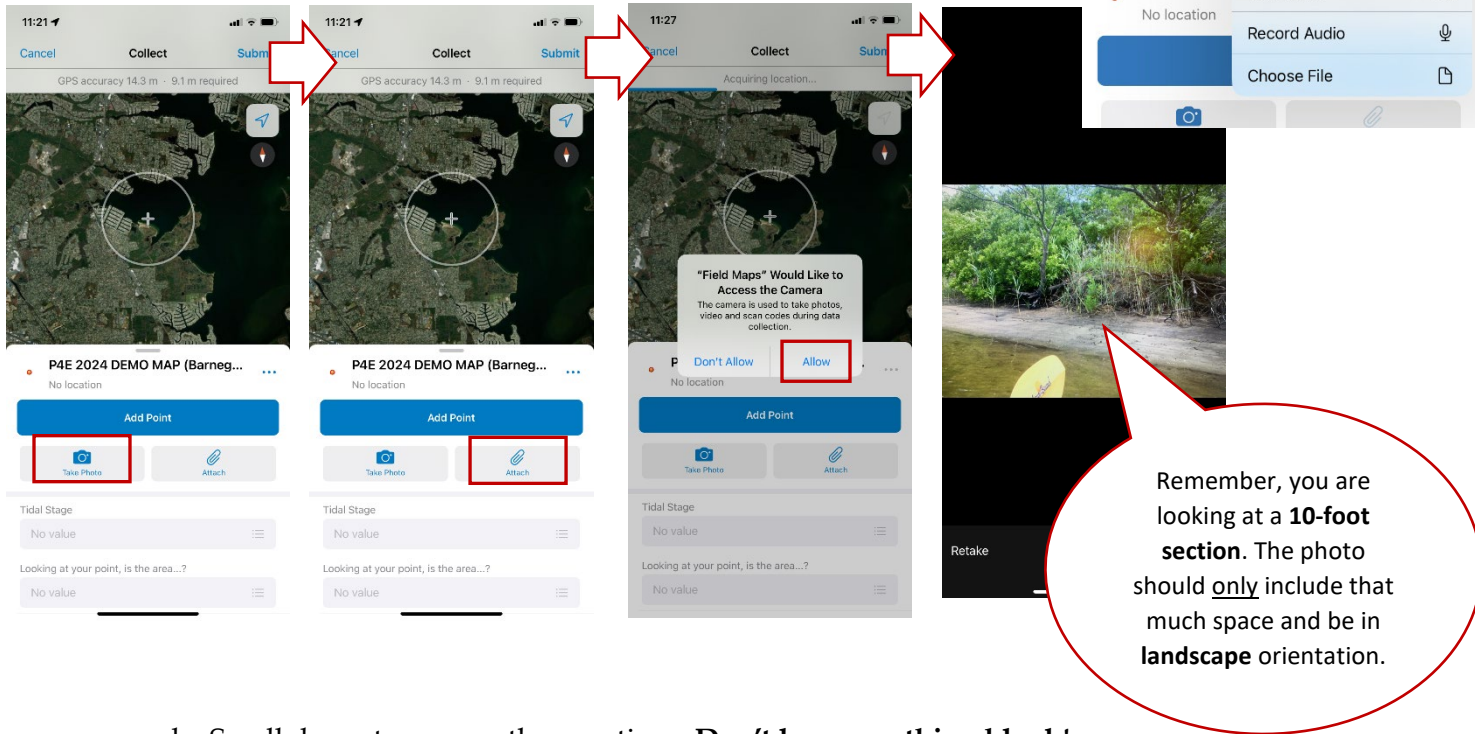
Ensure “Precise Location” is turned on.

- b. Once you have paddled to your assigned location and are looking at your first 10-foot section of the edge (or at home taking a test point!), click the **blue plus sign** at the **bottom right** of the map.



Check the Collection settings to make sure your changes were saved! Click on the three dots to the right of the map title and select “Collection settings”.

- c. Click on the camera icon that says **“Take Photo”**. Take a picture(s) in landscape orientation of the edge and select **“Use photo”** for iPhone or **“OK”** for Android.
- Already took a photo? Attach it by clicking **“Attach”** and then **“Choose Photo or video.”**



- d. Scroll down to answer the questions. **Don't leave anything blank!** Some additional questions may appear based on answers from previous questions.
- Ex./ If you select “undercut” for edge type, a new question will appear asking if the edge is cantilevered. If you select “perpendicular” or “gradual slope” for edge type, the cantilever question will remain hidden.
- e. Once you have answered ALL questions, select the button in the **top right corner** (iPhone says **“Submit”**, Android has a ✓). Congrats on your first point!
- f. Once you paddle 100 feet to your next 10-foot section, zoom into the map as far as you can. **Make sure the little blue dot designating your current location is not in the same place as the orange dot from your last location.** We don't want the GPS to think we are taking data in the same place! If it is in the same spot, check your Collection settings or close out of the app and come back in.

III. Completing the Survey

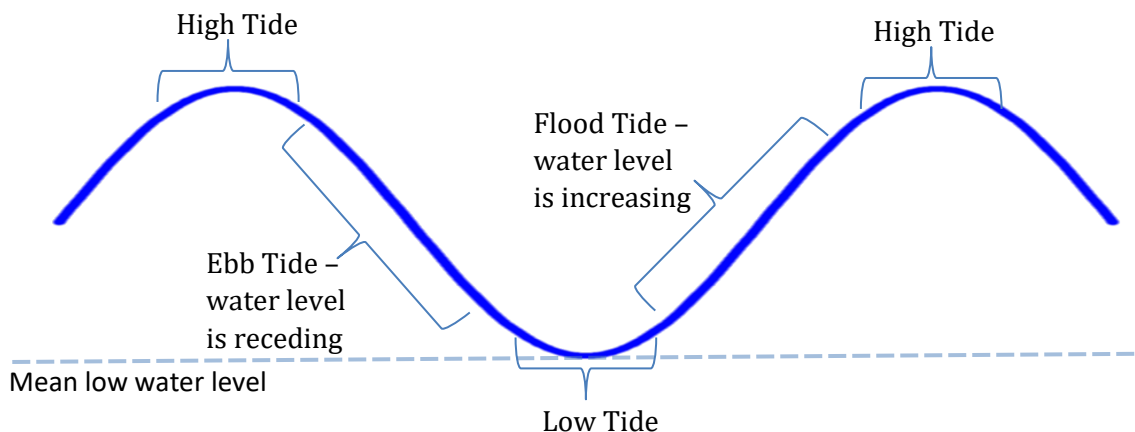
*** 1 data point = 10 feet of marsh edge ***

1. TIDAL STAGE

In order to get the highest quality data, the assessment must be completed at low tide. However, we know that is not always possible. Winds and freshwater input can make determining the tidal cycle in the field deceptive. We suggest using NOAA's tide charts before you go out. They can be found here:

http://tidesandcurrents.noaa.gov/tide_predictions.html?gid=82.

- **Slack low:** about a half hour on either side of low tide
- **Flood:** water is flowing toward the shore
- **Slack high:** about a half hour on either side of high tide
- **Ebb:** water is flowing back out toward the ocean



(NOTE: Do not attempt to go out at high tide - it makes seeing the edge difficult because it is underwater.)

2. WHAT TYPE OF BANK DO YOU SEE?

We want to know what you see when you look onshore. Different types of land use can have different effects on marsh edge and fall under different priorities when identifying restoration projects. Keep in mind that we are looking at the land use AT YOUR POINT. Sometimes you can see houses in the distance, but they might be across a channel and not associated with the marsh in front of you. Answer this question based on **200 feet landward and to each side of your section**. Imagine someone standing in the window of a house. If you cannot see them waving at you, they are too far away ("Undeveloped").

- **Undeveloped:** Nothing! A mostly untouched natural area.
- **Mostly Residential:** Single or multi-family housing, pools, driveways
- **Mostly Commercial:** Marinas, roads, golf courses

“Undeveloped”



“Mostly Residential”



“Mostly Commercial”



3. HOW HIGH IS THE BANK?

The bank height tells us what kind of physical processes to which the edge is susceptible. If the edge is tall, there is more area for wind and waves to pull sediment away and cause undercut. If the bank is short, there is a greater chance of sediment deposition allowing the marsh to build up. Estimate the height from the *top of the water* to the top of the soil on the edge.

- 0-5 ft
- 5-10 ft
- >10 ft



4. HOW MUCH VEGETATION COVERS THE FIRST 5 FEET ONSHORE?

Vegetation helps hold sediment in place and helps us determine the level of vulnerability to erosion. When looking *5 feet back onto the marsh platform*, estimate the percentage of plant coverage.

- >75% vegetation
- 50-75% vegetation
- Mostly Bare Soil/Sand
- Mostly Hardened

">75% Vegetated"



"50-75% Vegetated"



"Mostly Bare Soil/Sand"



"Mostly Hardened"



5. WHAT IS THE MOST ABUNDANT PLANT TYPE?

Different types of plants interact with the edge in different ways whether it is by the size of their roots, their ability to sequester carbon, or the animals that use them as habitat. Select the plant type that is most prominent in your 10-foot section.

- **Tall grass:** greater than 6 inches tall (about knee high)
- **Short grass:** less than 6 inches tall (about ankle high)
- **Reeds:** tall slender-leaved plants with rigid stalks (Phragmites is a common reedy plant)
- **Trees/Bushes:** rigid woody plants

“Tall grass”



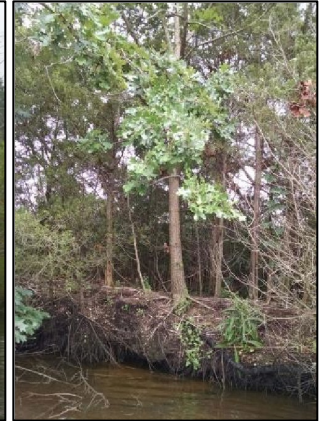
“Short grass”



“Reeds”



“Tree/Bushes”



6. IS THE SOIL YOU SEE....

Different sediment types react differently to the physical processes that occur on the marsh edge. They also determine the types of plants that can thrive there. Select the type of soil that covers the majority of your 10-foot section.

- **Sandy soil:** grainy, usually light colored
- **Mucky soil:** smooth, mushy, clay-like, usually dark colored

“Sandy soil”



“Mucky Soil”



7. ARE THERE MUSSELS PRESENT?

Mussels help stabilize the marsh edge. We want to know how many there are, and how they are distributed. *Single* mussels are found scattered along the edge by themselves. A *clumped* distribution consists of multiple mussels attached to the marsh in one spot. This could be just a handful of mussels or a whole bunch! *Continuous* mussels are seen covering the whole edge.

- 0
- 1-10 singles
- 1-10 clumped
- 10-100 singles
- 10-100 clumped
- 10-100 continuous
- 100-1000 clumped
- 100-1000 continuous

“Singles”



“Clumped”



“Continuous”



8. HOW MANY FIDDLER CRAB BURROWS DO YOU SEE?

Fiddler crabs are a great indicator of a living shoreline but their burrows can also decrease the stability of the edge. Record how many burrow holes you see on the edge. Sometimes there are so many that the edge looks like swiss cheese!

- 0
- 1-2
- Up to 10
- Looks like swiss cheese



9. ARE OYSTERS PRESENT?

While not having a direct impact on marsh edges, oysters are an important part of the bay in need of further study. They can be found attached to hard structures on the edge such as clumps of mussels, bulkheads, or pilings. They are often light gray with a muddled texture, compared to the dark ribbed appearance of mussels.

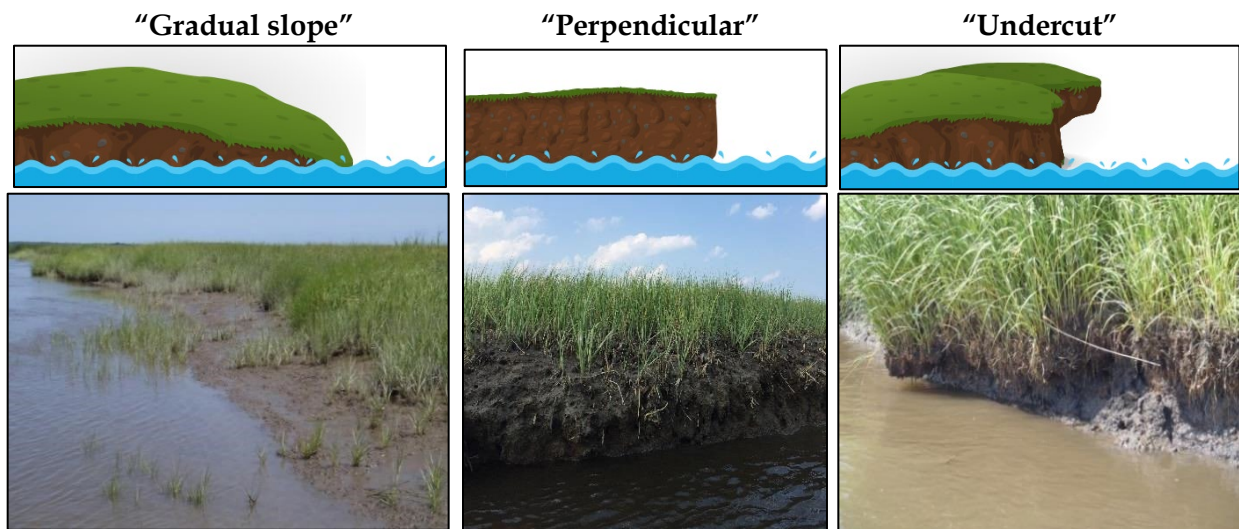
- Yes
- No



10. DESCRIBE THE SHAPE OF THE BANK:

This is perhaps the most important question in determining edge condition at a given point. The shape of the edge tells us about important physical processes acting on the edge. A *gradual slope* is a smooth transition from the bottom of the bay to the top of the marsh platform, like a beach. A *perpendicular* edge is a vertical line from the bottom of the bay to the top of the marsh, like a bulkhead. An *undercut* edge forms a curve toward the water but can be complex; it can be perpendicular most of the way up and then curve toward the water just at the top, or it can start curving right at the bottom. *An undercut edge can often be mistaken for a gradual slope at high tide when the water level is too high to see the bottom of the edge.*

- Gradual slope
- Perpendicular
- Undercut



11. IS THE BANK CANTILEVERED?

Cantilever is an architectural term meaning “attached on one side” and is often used to describe the awning of a building. This visual can be applied to the marsh edge. If an edge is undercut so severely that it sticks out like an awning over the water, it is cantilevered. Another way to think of it is if you were to stand on the marsh platform, would you be afraid of it breaking and falling into the water? If so, the edge is cantilevered! Select yes if you see this shape.

***Important note: an edge can only be cantilevered if it is undercut. Therefore, the cantilever question will not appear if you selected perpendicular or gradual slope for the previous question.**

****Additionally, make sure to check the edge underwater with your paddle! Sometimes a cantilevered edge is so severe that it looks like a gradual slope when the water is too high. Place your paddle at the bottom of the edge and if it disappears under the marsh, you have a cantilevered edge (document this in the photos or comments).**

- Yes
- No



12. IS THE BANK TIERED OR STEP-LIKE?

Sometimes erosion doesn't just whisk sediment away gradually, but it causes the whole edge to break off. This process results in multiple platforms at different elevations: often the chunk that fell off and the new marsh platform. Select yes if you see this shape.

- Yes
- No



13. DO YOU SEE EXPOSED ROOTS?

Marsh plants have long root systems to help withstand wind and wave energy. When erosion occurs, sediment is whisked away, exposing the root systems. Select yes if the roots are visible (**occurs in most perpendicular and undercut edges**).

- Yes
- No



14. ARE THERE CHUNKS OR PIECES OF MARSH IN THE WATER?

When bank failure occurs, the chunk of marsh falls into the water and can either sink, drift away, or reattach to the bottom of the bay nearby. Select yes if you see pieces of marsh in the water at your 10-foot section. **Note that chunks are sometimes submerged but can be identified by vegetation sticking out of the water.**

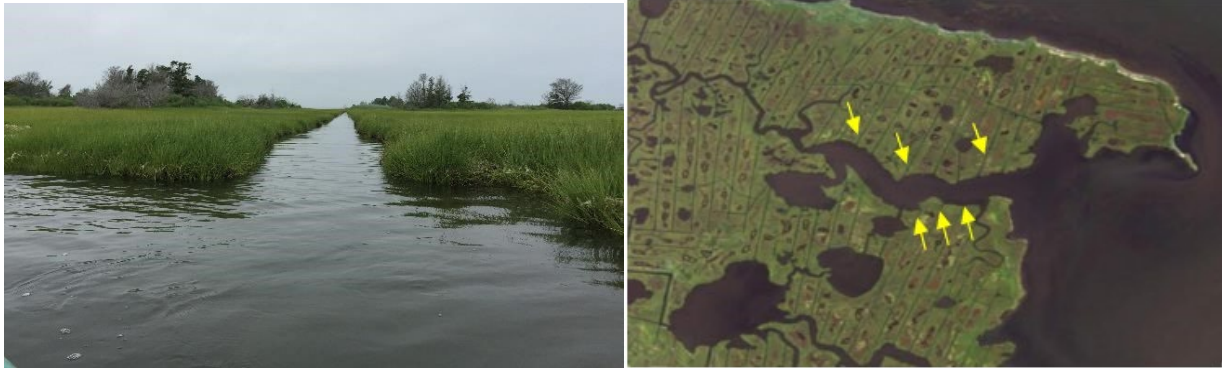
- Yes
- No



15. HAVE YOU PASSED ANY DITCHES SINCE YOUR LAST POINT?

Many marshes in Barnegat Bay consist of mosquito ditching – an attempt to keep water flowing off the marsh to prevent the creation of habitat ideal for mosquito larvae. This may have helped with mosquitoes, but caused a fragmented habitat that created extra marsh edge that is vulnerable to erosive processes. If you passed a ditch on your way to your current point, select yes.

- Yes
- No



16. HOW MANY PEOPLE DO YOU SEE?

We want to know how much people are using the bay in your assigned area! Let us know how many people you see outside of your paddle group.

17. WHAT ARE THEY DOING?

We want to know the various ways that people use the bay! Let us know what activities are going on around you.

18. WHAT TYPE OF STRUCTURES DO YOU SEE IN THE WATER?

You will often see unnatural objects at your data points. Similar to land use, these objects help us determine the vulnerability of the edge and identify potential restoration projects. Select the most prominent structures within your 10-foot section.

- None
- Unidentifiable/remnant
- Riprap
- Bulkhead
- Gravel/Cobblestone
- Groin/Jetty
- Pilings
- Pier/Dock
- Marina
- Boat Ramp

"Riprap"



"Bulkhead"



"Pier/Dock"



"Gravel/Cobblestone"



"Unidentifiable/Remnant"



"Groyne/Jetty"



"Pilings"



"Marina"



"Boat Ramp"



19. COMMENTS

Let us know everything and anything! See a cool bird? Tell us. Not sure about your answer to a survey question? Point that out. Did you see something that wasn't captured in your photos? Note that here. Use this section to help us see what you are seeing!

Appendix 1: Photo Taking Best Practices

Photos taken at each point are a critical part of the Paddle for the Edge data. We use these pictures as part of the Quality Control and Quality Assurance of the survey. They also allow us to further investigate priority areas determined by our analyses. These pictures should allow us to verify most, if not all, of your answers to the survey questions. Here are some examples of good pictures:



Here are some examples of pictures that make it difficult for us to see the edge:



These pictures are either too far away, too dark or too flooded for us to see any of the important erosional characteristics of your edge. Please make sure you take the time to take a good picture.

Some tips:

- Remember that you are only photographing a **10-foot section**. We need to see the edge details, not vast landscapes.
- Is the sky bright and the edge dark? **Adjust the exposure** by tapping the part of the screen where you want to see the details (the edge!). This should automatically adjust the exposure on the camera to darken the sky and lighten the edge. You can also tap the screen and hold, then move your finger up and down to manually adjust the exposure.
- Can't see the details of mussels and crab burrows from your photo? **Take another!** Move closer or zoom in to capture all the details. Take extra photos to capture specific details and add comments! However, don't take too many photos! We only need to see a 10-foot section at a time.